Sustainable infection prevention: is it possible?

Murphy, Cathryn

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Every day the Australian healthcare sector provides hospital-based care and services to several thousand Australians. In 2014-15 there were 1,322 hospitals in Australia. Of these 698 were public hospitals and 624 private hospitals who employed about 330,000 and 64,400 full-time equivalent staff respectively. In the same year Australian hospitals provided almost 10.2 million hospitalisations.[1]

However, you choose to look at it Australia's healthcare is a large, busy and complex system. To deliver its services this system is a major user of environmental resources and it inevitably makes a lasting and wide-ranging impact on Australia and other parts of our planet. Regardless there is little written on how Australia's healthcare system can reduce its environmental impact and to the author's knowledge specific actions that the Australian infection prevention and control community can take are yet to be defined.

In a seminal US-based paper published in 2011 Pyrek suggests that appropriate activities for infection preventionists to consider include:

- environmentally preferred purchasing,
- reducing chemical use,
- actively seeking alternative sustainable products,
- engaging in green building,
- reducing consumption of energy, water and raw materials,
- minimizing waste,
- engaging in recycling programs,
- transitioning to renewable energy sources;
- eliminating incineration, and
- improving transportation strategies.[2]

The purpose of this article is to showcase opportunities to reduce the use of potentially dangerous chemicals in hand hygiene products by converting to those containing more natural alternatives with equivalent efficacy.

Since the mid-1880s hand hygiene has been recognised as the most effective method of preventing and controlling healthcare associated infections (HAIs).[3] More recently it has become a key indicator of an organisation's commitment to patient and staff safety with multiple formulations of alcohol-based hand rub (ABHR) solution promoted as the "products of choice".[3] A very recent prospective study conducted in a European haematology transplant ward suggests that clinicians perform on average 53 hand-rub activities (HRAs) per day using 160mls of ABHR. They also note that the frequency of HRA is likely to vary depending on location, HCW-type and time.[4]

Experts recognise that an ABHR must contain between 60%-95% alcohol to be effective against a wide-range of potential pathogens carried on healthcare workers (HCWs') hands.[5] Typically the types of alcohol used in ABHRs are commonly either isopropanol, ethanol or *n*-propanol, or a combination of two of these.[6] The efficacy of these agents can be affected by the type of alcohol, its concentration, how it is used, how much is used and for how long.[6] ABHRs may also contain additional antiseptics, sporicides, emollients, gelling agents, foams, colorants, fragrances and water. For reasons of commercial in confidence some of these ingredients may be undeclared on ABHR labels yet the product may still be compliant with local regulatory and labelling requirements.[6] Given

both the high-frequency and volume routinely used, for HCWs these "hidden" ingredients or the ways in which they are metabolised may be potentially harmful for either or both the HCW and the environment.

In the US the Food and Drug Administration has recently shown their concern for the safety of community use of ABHRs by requesting additional scientific data from ABHR manufacturers to support the safety and efficacy of their ABHR formulations. The FDA is seeking safety assurances regarding manufacturers' use of alcohol (ethanol or ethyl alcohol), isopropyl alcohol and benzalkonium chloride all of which are commonly used in ABHR formulations used frequently and for extended periods by HCWs around the world.[7]

As more HCWs question the long-term personal and environmental safety of frequent use chemicals in healthcare it would seem reasonable that more natural options present greater personal, patient and environmental safety. A good example of this is a new natural product for hand hygiene which contains alcohol derived from sugar cane and corn not isopropyl alcohol. By using formulas based on Australian botany including eucalyptus oil the Australian-based team manufactured a range of antimicrobial skin antiseptics and hard surface disinfectants that have broad-spectrum antimicrobial, antibacterial, antifungal and viricidal efficacy and are compliant with the National Industrial Chemicals Notification and Assessment Scheme and the Therapeutic Goods Administration (TGA) requirements.

Inevitably future generations of HCWs will face increasingly complex infection prevention and control challenges. Without serious research, investment and adoption of safe alternatives that future will require the use of new, more efficacious but dangerous chemicals. Hopefully progress in the development of safer, environmentally-friendly, efficacious chemicals and non-chemical alternatives will be prolific. If not, like many other areas of Australian healthcare, the infection control community must accept its contribution to an unsustainable environment future.

Disclaimer:

Assoc. Prof Cath Murphy RN, B. Photog, MPH, PhD, CIC is a consultant to multiple medical manufacturers globally including elyptol Australia. Views expressed in this article are the author's own. No company or client had any input into this manuscript and no remuneration was received for it.

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